
A Breakdown of Cultural Barriers

Scientists in the ARS Corn and Soybean Research Unit at Wooster, Ohio, have developed a novel way to cut out the insect middleman in their research with corn viruses. They've pioneered a method for transmitting viruses to plants directly, without using insects as vectors.

"There are many technical and economic advantages to being able to transmit viruses without using insects," says plant pathologist Raymond Louie, Jr. Development of the method was a necessary step for research progress, he says.

Previously, plant viruses such as maize streak and maize rough dwarf—which inflict millions of dollars worth of damage on corn crops in developing countries—could only be studied by using vectors such as leafhoppers and planthoppers. These insects transmit and spread the viruses naturally when they feed on corn plants.

Until recently, scientists have had to obtain, breed, and maintain specific insects known to serve as vectors of the viruses they've wanted to study. This complicated the research effort.

Some insects could not be brought into the United States, thus prohibiting research on some viruses. Other insect vectors had to be cultured in the laboratory, which is an expensive and labor-intensive process.

Scientists at Wooster experimented with a variety of transfer methods that not only delivered the plant viruses to the plant host, but allowed the researchers to isolate a specific virus and reduce the risk of contamination by other viruses.

"We often have a problem in studying viruses because insects may carry and transmit more than one type," says Louie. "With manual transmission, we can be sure we are infecting the corn plant with a known

virus. This capability offers us the opportunity to study the effects of infection by either a single virus or a mix of viruses"

Using insect pins mounted on an ordinary engraving tool, ARS researchers have been able to successfully transfer all major corn viruses into mature corn seeds that were first presoaked for about 2 hours in water. The tool vibrates the pin, which is pushed through a drop of virus and into the seed's vascular system. When done properly, this allows the virus to enter the corn embryo within.

Scientists say bypassing insect vectors will allow them to more easily isolate viruses for characterization, help them to determine the virulence of a particular virus without contamination from other viruses, and lead to more accurate identification of resistant germplasm.—By **Dawn Lyons Johnson, ARS.**

Raymond Louie, Jr., is in the USDA-ARS Corn and Soybean Research Unit, Ohio Agricultural Research and Development Center, 1680 Madison Ave., Wooster, OH 44691; phone (330) 263-3836, fax (330) 263-3841, e-mail louie.2@osu.edu ♦